

### **Non-Technical Abstract**

**“A phase I/II study of anti-tumor vaccination using the  $\alpha(1,3)$ galactosyltransferase expressing allogeneic tumor cells in patients with relapsed or refractory breast cancer”**

Unfortunately, despite the best clinical science and all the breakthroughs in biotechnology, some women with breast cancer continue to die from disease progressing outside of the breast and spreading within her body. This happens for several different reasons. One reason is that the cancer becomes resistant to chemotherapy, and resistance to one type of chemotherapy often leads to resistance against many other types of chemotherapy. In addition, breast cancer cells that were once inhibited by hormonal blockade become independent of the need for estrogen and are no longer killed or slowed by treatment with anti-hormonal therapy such as tamoxifen. At the same time the breast cancer cells can also develop an ability to spread in the body and grow in other organs such as the liver, lung or brain. This spread or metastasis as it is called means that options for treatment such as surgery are no longer useful.

These reasons are the major causes of cancer progression that are usually discussed when considering treatment options for patients with disease that continues to grow and spread. However, another important part of the body should be considered, the immune system. Scientists have shown clearly that breast cancer cells produce a number of abnormal proteins that are not present in the normal human body. Normally one would expect a woman to develop an immune response against the abnormal proteins in her cancer and attack them much the way she would fight off an infection from a bacteria. However, for reasons that scientists do not fully understand, the immune system fails to detect these abnormal cancer proteins and does not attack the breast cancer cells. This human clinical trial proposes a new way to make the immune system recognize the cancer and encourage it to attack the cancer cells.

Many people are familiar with the idea of transplants between people of organs like the kidney or the heart. When such an organ transplant between two people is completed one of the problems that can occur is organ rejection. This can occur because the immune system of the patient who receives the organ attacks the donated organ as if it were foreign. If you were to attempt to transplant a pig heart to a human the rejection would be dramatically stronger than when organs are transplanted between people. This is partly because lower animals make sugar patterns on the surface of their cells that people do not. In fact our immune systems can quickly recognize cells from lower mammals such as mouse and destroy them. In this project the concept is to put a mouse gene into human breast cancer cells to produce abnormal sugars and stimulate the immune system to attack the breast cancer. This strategy works well to kill human breast cancer cells in the laboratory, but it needs to be tried in breast cancer patients to see if it will be effective and to determine if such a treatment causes any side effects. We propose to test this new treatment concept in women with breast cancer who have failed at least one salvage therapy and to see if it can stop slow or destroy tumors in women. This trial will be well designed scientifically and conducted in an ethical manner.